IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Inventor:	OKA, et al
Group Art Unit:	1752
Application No.:	10/602,622
Conf. No.:	2391
Examiner:	Thorl Chea
Filed:	June 25, 2003
Title:	PHOTOTHERMOGRAPHIC MATERIAL

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents

(P.O. Box 1450

Alexandria, VA 22313-1450)

Sir:

I, Seiichi Yamamoto, do declare and state as follows:

I graduated from Tohoku University with a Master's Degree in Chemistry in March 1990;

I joined Fuji Photo Film Co., Ltd. in April 1990, and since that time I have been engaged in research and development in the field of silver halide photosensitive materials for printing, and since March 2000, in the field

of silver halide photosensitive materials for medical use at Ashigara Laboratory;

I am a co-inventor of the subject matter disclosed and claimed in the above-identified application; and

I am familiar with the Office Action of November 23, 2005, and understand that the Examiner has rejected Claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Okada et al (US Patent No. 5,952,167), Ikari (US Patent No. 6,482,583), Siga et al (US Patent No. 4,332,889) and Toya et al (US Patent No. 5,998,126) and Claims 10, 13-20 under 35 U.S.C. § 103(a) as being unpatentable over Ito (US Patent No. 6,376,167).

The following additional comparative experiments were carried out by me or under my supervision in order to make the advantages of the subject matter clearer.

Experiment I

Samples 3d, 3e, 5d, 5e, 6d, 6e, 7d, 7e, 8d, 8e, 9d and 9e were prepared and added to the Experiment B in the declaration dated on January 19, 2005.

Samples 3d, 3e, 5d, 5e, 6d, 6e, 7d, 7e, 8d, 8e, 9d and 9e were prepared in the same manner as in Example 4 described in Applicants' Specification, except that the doped metals

in the photosensitive halide emulsion and their amount were changed to those as shown in Table I below, so that the amount of metal used singly becomes equal to the combination of the pair.

Grains in the silver halide used in Example 4 were pure silver iodide as described in Applicants' Specification, on page 161 lines 2-6.

Samples 3d, 3e, 5d, 5e, 6d, 6e, 7d, 7e, 8d, 8e, 9d and 9e were processed and evaluated in the same manner as in Example 4 described in Applicants' Specification.

The results obtained are listed in following currently amended Table I.

TABLE I

Sample No.	First Metal	First Metal Amount mol/Ag	Second Metal	Second Metal Amount mol/Ag	Dmin	Sensitivity	Printout performance	Remarks
3a	Ir	5×10^{-4}	-	-	0.17	100	0.11	Comparative Example
3b	-	-	Fe	3×10^{-3}	0.17	103	0.10	Comparative Example
3d	-	-	Fe	5×10^{-4}	0.17	102	0.10	Comparative

								Example
3e	Ir	2.5×10^{-4}	Fe	2.5×10^{-4}	0.16	106	0.07	Present Invention
3'	Ir	5×10^{-4}	Fe	3×10^{-3}	0.16	107	0.07	Present Invention
10-1	Ir	5×10^{-4}	Au	3×10^{-3}	0.18	110	0.12	Comparative Example
5a	Cu	5×10^{-4}	-	-	0.17	101	0.10	Comparative Example
5b	-	-	Fe	3×10^{-3}	0.17	103	0.10	Comparative Example
5d	-	-	Fe	5×10^{-4}	0.17	102	0.10	Comparative Example
5e	Cu	2.5×10^{-4}	Fe	2.5×10^{-4}	0.16	104	0.07	Present Invention
5'	Cu	5×10^{-4}	Fe	3×10^{-3}	0.16	105	0.07	Present Invention
10-2	Cu	5×10^{-4}	Au	3×10^{-3}	0.18	109	0.11	Comparative Example
6a	Fe	5×10^{-4}	-	-	0.17	101	0.10	Comparative Example
6b	-	-	Pt	3×10^{-3}	0.17	102	0.10	Comparative Example
6d	-	-	Pt	5×10^{-4}	0.17	101	0.10	Comparative Example

6e	Fe	2.5 $\times10^{-4}$	Pt	2.5 $\times10^{-4}$	0.16	106	0.08	Present Invention
6'	Fe	5×10^{-4}	Pt	3×10^{-3}	0.16	106	0.08	Present Invention
7a	Os	5×10^{-4}	-	-	0.17	100	0.10	Comparative Example
7b	-	-	Fe	3×10^{-3}	0.17	103	0.10	Comparative Example
7d	-	-	Fe	5×10^{-4}	0.17	102	0.10	Comparative Example
7e	Os	2.5 $\times10^{-4}$	Fe	2.5 $\times10^{-4}$	0.16	105	0.07	Present Invention
7'	Os	5×10^{-4}	Fe	3×10^{-3}	0.16	106	0.07	Present Invention
10-3	Os	5×10^{-4}	Au	3×10^{-3}	0.18	110	0.11	Present Invention
8a	Ru	5×10^{-4}	-	-	0.17	104	0.11	Comparative Example
8b	-	-	Fe	3×10^{-3}	0.17	103	0.10	Comparative Example
8d	-	-	Fe	5×10^{-4}	0.17	101	0.10	Comparative Example
8e	Ru	2.5 $\times10^{-4}$	Fe	2.5 $\times10^{-4}$	0.16	105	0.07	Present Invention
8c	Ru	5×10^{-4}	Fe	3×10^{-3}	0.17	106	0.07	Present

								Invention
9a	-	-	-	-	0.18	98	0.12	Comparative Example
9b	-	-	Cu	3×10^{-3}	0.17	101	0.11	Comparative Example
9d	-	-	Cu	5×10^{-4}	0.17	100	0.11	Comparative Example
9e	Ru	2.5 $\times10^{-4}$	Cu	2.5 $\times10^{-4}$	0.16	103	0.06	Present Invention
9c	Ru	5×10^{-4}	Cu	3×10^{-3}	0.05	104	0.06	Present Invention
10-4	-	-	Au	3×10^{-3}	0.19	109	0.12	Comparative Example
10-5	Fe	5×10^{-4}	Au	3×10^{-3}	0.19	109	0.11	Comparative Example

Note: For "Au", Potassium chloroaurate, which is typical as an Au-sensitizer, was used, and substituted at an amount of equimolar of Fe compound.

As shown in Table I, Samples 3e, 5e, 6e, 7e, 8e and 9e, the samples containing the combination of the pair metals exhibited unexpected superiority in comparison to Samples 3d, 5d, 6d, 7d, 8d and 9d, the samples containing a single metal.

Conclusions

The present invention showed unexpectedly greater improvements of the samples containing the combination of the pair metals in sensitivity, printout performance and fogging during storage than the comparative examples.

Experiment II

Samples 3a, 3b, 5a, 5b, 18a, 18b, 20a, 20b, 33a, 33b, 35a and 35b were prepared and added to the Additional comparative experiments in the declaration dated on September 13, 2005.

Samples 3a, 3b, 5a, 5b, 18a, 18b, 20a, 20b, 33a, 33b, 35a and 35b were prepared in the same manner as Samples in the declaration dated on September 13, 2005, except that the sum of the amount of the mercapto compound and the amount of the polyhalogen compound in the samples is equal.

Samples 3a, 3b, 5a, 5b, 18a, 18b, 20a, 20b, 33a, 33b, 35a and 35b were processed and evaluated sensitivity, fogging and printout performance in the same manner as in Example described in Applicants' Specification.

The results obtained are listed in following currently amended Table II.

TABLE II

Sample No.	silver halide emulsion	silver halide composition	mercapto hetero-ring compd.	mercapto hetero-ring compd. Amount mol/molAg	hetero-ring poly-halogen compd.	hetero-ring poly-halogen compd. Amount mol/molAg	sensitivity	fogging	Printout performance ΔDmin	Remarks
1	No. 1	AgBr	-	-	-	-	100	0.21	0.21	Comparative Example
2	No. 1	AgBr	I-2	7.6×10^{-4}	-	-	142	0.16	0.18	Comparative Example
3	No. 1	AgBr	-	-	No. 1	1.1×10^{-3}	90	0.16	0.20	Comparative Example
3a	No. 1	AgBr	-	-	No. 1	7.6×10^{-4}	95	0.16	0.20	Comparative Example
3b	No. 1	AgBr	I-2	3.8×10^{-4}	No. 1	3.8×10^{-4}	125	0.15	0.15	Comparative

										Example
4	No. 1	AgBr	I-2	7.6×10^{-4}	No. 1	1.1×10^{-3}	120	0.15	0.14	Comparative Example
5	No. 1	AgBr	-	-	No. 2	1.1×10^{-3}	89	0.16	0.15	Comparative Example
5a	No. 1	AgBr	-	-	No. 2	7.6×10^{-4}	93	0.16	0.16	Comparative Example
5b	No. 1	AgBr	I-2	3.8×10^{-4}	No. 2	3.8×10^{-4}	129	0.15	0.15	Comparative Example
6	No. 1	AgBr	I-2	7.6×10^{-4}	No. 2	1.1×10^{-3}	125	0.15	0.16	Comparative Example
7	No. 1	AgBr	-	-	No. 5	1.1×10^{-3}	88	0.16	0.15	Comparative Example
8	No. 1	AgBr	I-2	7.6×10^{-4}	No. 5	1.1×10^{-3}	128	0.15	0.13	Comparative Example

9	No. 1	AgBr	-	-	No. 6	1.1×10^{-3}	106	0.16	0.14	Comparative Example
10	No. 1	AgBr	I-2	7.6×10^{-4}	No. 6	1.1×10^{-3}	94	0.15	0.13	Comparative Example
11	No. 1	AgBr	I-5	7.6×10^{-4}	-	-	138	0.17	0.16	Comparative Example
12	No. 1	AgBr	I-5	7.6×10^{-4}	No. 1	1.1×10^{-3}	106	0.15	0.15	Comparative Example
13	No. 1	AgBr	I-5	7.6×10^{-4}	No. 2	1.1×10^{-3}	105	0.15	0.15	Comparative Example
14	No. 1	AgBr	I-5	7.6×10^{-4}	No. 5	1.1×10^{-3}	104	0.15	0.15	Comparative Example
15	No. 1	AgBr	I-5	7.6×10^{-4}	No. 6	1.1×10^{-3}	103	0.15	0.15	Comparative Example
16	No. 1a	AgBr90I10	-	-	-	-	98	0.20	0.16	Comparative

										Example
17	No. 1a	AgBr90I10	I-2	7.6×10^{-4}	-	-	140	0.16	0.15	Comparative Example
18	No. 1a	AgBr90I10	-	-	No. 1	1.1×10^{-3}	85	0.16	0.14	Comparative Example
18a	No. 1a	AgBr90I10	-	-	No. 1	7.6×10^{-4}	95	0.16	0.15	Comparative Example
18b	No. 1a	AgBr90I10	I-2	3.8×10^{-4}	No. 1	3.8×10^{-4}	140	0.14	0.08	Present Invention
19	No. 1a	AgBr90I10	I-2	7.6×10^{-4}	No. 1	1.1×10^{-3}	137	0.14	0.08	Present Invention
20	No. 1a	AgBr90I10	-	-	No. 2	1.1×10^{-3}	84	0.13	0.14	Comparative Example
20a	No. 1a	AgBr90I10	-	-	No. 2	7.6×10^{-4}	97	0.14	0.15	Comparative Example

20b	No. 1a	AgBr90I10	I-2	3.8×10^{-4}	No. 2	3.8×10^{-4}	140	0.14	0.07	Present Invention
21	No. 1a	AgBr90I10	I-2	7.6×10^{-4}	No. 2	1.1×10^{-3}	138	0.14	0.07	Present Invention
22	No. 1a	AgBr90I10	-	-	No. 5	1.1×10^{-3}	83	0.13	0.13	Comparative Example
23	No. 1a	AgBr90I10	I-2	7.6×10^{-4}	No. 5	1.1×10^{-3}	136	0.14	0.08	Present Invention
24	No. 1a	AgBr90I10	-	-	No. 6	1.1×10^{-3}	85	0.13	0.13	Comparative Example
25	No. 1a	AgBr90I10	I-2	7.6×10^{-4}	No. 6	1.1×10^{-3}	136	0.15	0.07	Present Invention
26	No. 1a	AgBr90I10	I-5	7.6×10^{-4}	-	-	138	0.13	0.13	Comparative Example
27	No. 1a	AgBr90I10	I-5	7.6×10^{-4}	No. 1	1.1×10^{-3}	135	0.14	0.08	Present

										Invention
28	No. 1a	AgBr90I10	I-5	7.6×10^{-4}	No. 2	1.1×10^{-3}	139	0.14	0.08	Present Invention
29	No. 1a	AgBr90I10	I-5	7.6×10^{-4}	No. 5	1.1×10^{-3}	140	0.14	0.08	Present Invention
30	No. 1a	AgBr90I10	I-5	7.6×10^{-4}	No. 6	1.1×10^{-3}	137	0.14	0.08	Present Invention
31	No. 1b	AgBr10I90	-	-	-	-	95	0.17	0.12	Comparative Example
32	No. 1b	AgBr10I90	I-2	7.6×10^{-4}	-	-	141	0.15	0.11	Comparative Example
33	No. 1b	AgBr10I90	-	-	No. 1	1.1×10^{-3}	82	0.13	0.11	Comparative Example
33a	No. 1b	AgBr10I90	-	-	No. 1	7.6×10^{-4}	95	0.14	0.12	Comparative Example

33b	No. 1b	AgBr10I90	I-2	3.8×10^{-4}	No. 1	3.8×10^{-4}	144	0.14	0.06	Present Invention
34	No. 1b	AgBr10I90	I-2	7.6×10^{-4}	No. 1	1.1×10^{-3}	141	0.14	0.06	Present Invention
35	No. 1b	AgBr10I90	-	-	No. 2	1.1×10^{-3}	84	0.13	0.11	Comparative Example
35a	No. 1b	AgBr10I90	-	-	No. 2	7.6×10^{-4}	97	0.14	0.12	Comparative Example
35b	No. 1b	AgBr10I90	I-2	3.8×10^{-4}	No. 2	3.8×10^{-4}	143	0.14	0.06	Present Invention
36	No. 1b	AgBr10I90	I-2	7.6×10^{-4}	No. 2	1.1×10^{-3}	140	0.14	0.06	Present Invention
37	No. 1b	AgBr10I90	-	-	No. 5	1.1×10^{-3}	83	0.13	0.11	Comparative Example
38	No. 1b	AgBr10I90	I-2	7.6×10^{-4}	No. 5	1.1×10^{-3}	139	0.14	0.07	Present

										Invention
39	No. 1b	AgBr10I90	-	-	No. 6	1.1×10^{-3}	85	0.13	0.11	Comparative Example
40	No. 1b	AgBr10I90	I-2	7.6×10^{-4}	No. 6	1.1×10^{-3}	138	0.15	0.07	Present Invention
41	No. 1b	AgBr10I90	I-5	7.6×10^{-4}	-	-	140	0.13	0.11	Comparative Example
42	No. 1b	AgBr10I90	I-5	7.6×10^{-4}	No. 1	1.1×10^{-3}	141	0.14	0.06	Present Invention
43	No. 1b	AgBr10I90	I-5	7.6×10^{-4}	No. 2	1.1×10^{-3}	142	0.14	0.05	Present Invention
44	No. 1b	AgBr10I90	I-5	7.6×10^{-4}	No. 5	1.1×10^{-3}	143	0.14	0.06	Present Invention
45	No. 1b	AgBr10I90	I-5	7.6×10^{-4}	No. 6	1.1×10^{-3}	142	0.14	0.07	Present Invention

Sensitivity is shown as a relative value taking the sensitivity of Sample No. 1 to be 100.

As seen in Table II above, the combination of the silver halide emulsion, the mercapto hetero-ring compound and the hetero-ring polyhalogen compound of the present invention were unexpectedly superior in fogging and printout performance (ΔDmin) in comparison to the comparative examples, while maintaining high sensitivity.

In the combinations of mercapto hetero-ring compound and hetero-ring polyhalogen compound in the examples of the present invention, ΔDmin decreases by 0.06-0.08, and ΔDmin is lower than 0.1.

Conclusions

The present invention showed unexpectedly greater improvements of the the samples containing the combination of the mercapto hetero-ring compound and hetero-ring polyhalogen compound in sensitivity, printout performance and fogging during storage than the comparative examples.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATE: April 7, 2006

Seiichi Yamamoto

SEIICHI YAMAMOTO